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# SCIENCE NEWS LETTER



Scientists of the Future

See Page 162

A SCIENCE SERVICE PUBLICATION



## GENERAL SCIENCE

# Top Science Scholarships

**Products of the American "melting pot", Rada Demerec, geneticist, and Martin Karplus, ornithologist, received the Westinghouse Grand Scholarships of \$2,400.**

► THE AMERICAN "melting pot" has produced the nation's top high school scientists for 1947—the daughter of a foreign-born American scientist and a boy whose family fled to this country when the Nazis invaded their native Austria.

Vera R. Demerec, 16, Huntington High School, Huntington, N. Y., and Martin Karplus, 16, Newton High School, Newtonville, Mass., hold Westinghouse Grand Science Scholarships of \$2,400. They were awarded the scholarships at the close of the five-day Science Talent Institute for the 40 winners of the Sixth Annual Science Talent Search, conducted by Science Clubs of America, administered by Science Service.

### Rada

Miss Demerec, whose friends call her "Rada," studied genetics in generations of fruit flies. She plans to enter Swarthmore College to continue her work.

It was a case of "like father, like daughter" for Miss Demerec. She hopes to continue the studies in genetics which won her the scholarship and follow in the footsteps of her father, Dr. M. Demerec, head of the Department of Genetics of the Carnegie Institution of Washington at Cold Spring Harbor, N. Y. Dr. Demerec was born in Yugoslavia, and Mrs. Demerec was born in Russia.

### Martin

Among Mr. Karplus' relatives are two of the world's most famous refugees from Hitler's conquests, the two German scientists who explained the way that uranium, under neutron bombardment, releases energy by splitting into other elements. They are Dr. Robert Frisch, a second cousin of the Science Talent Search winner, and Dr. Lise Meitner, a more distant relative.

## GENERAL SCIENCE

### Winners of Westinghouse Science Scholarships

**GRAND SCHOLARSHIPS OF \$2,400**  
Demerec, Vera Radslava, Huntington, N. Y.  
Karplus, Martin, Newtonville, Mass.

### ALTERNATES

Nagy, Irene Elizabeth, Bridgeport, Conn.  
Gordon, Milton Paul, St. Paul, Minn.

### SCHOLARSHIPS OF \$400

Nagy, Irene Elizabeth, Bridgeport, Conn.  
Bieber, Herman, Brooklyn, N. Y.  
Clore, Paul LeRoy, Orono, Maine  
Eisenberg, Jerome Martin, Philadelphia, Pa.  
Felsenfeld, Gary, New York, N. Y.  
Gordon, Milton Paul, St. Paul, Minn.  
McLeish, William Lee, Cincinnati, Ohio  
Smith, Norman Harkey, Urbana, Ill.

### ALTERNATES

Addleman, Mary, Chicago, Ill.  
Simmons, Gustavus James, Sissonville, W. Va.

Wilt, James William, Chicago, Ill.

### SCHOLARSHIPS OF \$100

Addleman, Mary, Chicago, Ill.  
Briggs, Marilyn Louise, Mt. Sterling, Ill.  
Cooley, Robin, Albany, N. Y.  
Hersey, Anne, New York, N. Y.  
Self, Cecilia Maud, Bakersfield, Calif.  
Semiat, Paula B., New York, N. Y.  
Christensen, Dorothy Jean, Eugene, Ore.  
Cole, Irwin Harold, Cliffside, N. J.  
Cooper, Leon N., New York, N. Y.  
Emrick, Donald Day, Waynesfield, Ohio  
Gregory, Clarence Leslie, Jr., Greenwich, Conn.

Halverson, Phillip Carl, Los Angeles, Calif.  
Haugh, Eugene Frederick, Reedsburg, Wis.  
Hayes, John Richard, Clifton, N. J.  
House, Herbert Otis, Willoughby, Ohio  
Inman, Charles Gordon, Buffalo, N. Y.  
Kamb, Walter Barclay, Pasadena, Calif.  
Kopple, Kenneth David, Philadelphia, Pa.  
Mattuck, Arthur Paul, Brooklyn, N. Y.  
Maynard, Donald More, Nashville, Tenn.  
McKenna, James, Lebanon, N. H.  
Pike, John Nazarian, Upper Montclair, N. J.  
Radack, Herbert Brahm, New York, N. Y.  
Relyea, Douglas Irving, Perry, N. Y.  
Rennagel, William Robert, Eden, N. Y.  
Shapiro, David Gordon, Washington, D. C.  
Simmons, Gustavus James, Sissonville, W. Va.  
Taylor, Leonard Stuart, New York, N. Y.  
Wilt, James William, Chicago, Ill.  
Zemach, Ariel, New York, N. Y.

### THE JOHN TAYLOR HOPKINS IV AWARD

Simmons, Gustavus James, Sissonville, W. Va.  
Judges: Dr. Harlow Shapley, Dr. Harold A. Edgerton, Dr. Steuart Henderson Britt and Dr. Rex E. Buxton.

Science News Letter, March 15, 1947

**TOP TEN—Left to right: Milton Paul Gordon, alternate boy for the top scholarship; the group visits the petroleum division of the Bureau of Standards; Irene Nagy, alternate girl for the \$2,400 scholarship. The top winners are congratulated by Dr. Harlow Shapley, Dr. Vannevar Bush and Watson Davis. Some of the group are shown talking with Dr. Alfred Blalock. Winners of \$400 scholarships: Herman Bieber, Paul Cloke, Jerome Eisenberg, Gary Felsenfeld, William McLeish, and Norman Smith.**

## GENERAL SCIENCE

# Science for Its Own Sake

Seek knowledge because it is good, Dr. Vannevar Bush urged the Science Talent Search winners at their awards banquet.

► SCIENCE is a "regenerative system" which reveals new unknowns with every discovery made and each question answered, Dr. Vannevar Bush, president of the Carnegie Institution of Washington and chairman of the Joint Research and Development Board, told the nation's outstanding high school scientists at the awards banquet of the Sixth Annual Science Talent Search.

Dr. Bush, who headed the wartime Office of Scientific Research and Development, described his philosophy of science.

Urging the science-minded high school seniors to seek knowledge for knowledge's sake, Dr. Bush said the essential condition to science is "an intense, innate conviction that knowledge is good, that knowing is good, and that therefore to increase knowledge by conscious willed exertion of the intelligence is both duty and high privilege."

While practical application of science may seem the most important thing to the general public, the scientist gets his greatest satisfaction from increasing knowledge, Dr. Bush explained.

"In general," he told the Science Talent Search winners, "the knowledge out

of which some practical advantage or benefit grows has itself been long in existence before the application is made—and this is true in general even in our own time of skill in applied research for a definite purpose.

"Often, moreover," the scientist added, "new knowledge comes to light at a time and in a way having no relation whatever to possible applications."

Dr. Bush said the human has four great sources of strength on which to draw for his energy to carry on work: reason, imagination, physique and spirit.

"In science the great draft is on reason," he declared.

The scientist also uses imagination in building a new theory, his physique in using apparatus and meeting the strain of long hours of concentration on a problem, and his spirit often has a part in his work, the speaker explained.

Warning his audience that "There are a lot of easier ways of earning a living, and sometimes a more cushiony living, in the material sense, than is the usual scientist's lot," Dr. Bush said, "science for the sake of science" is cause enough for the scientist to pursue his work.

Science News Letter, March 15, 1947

## EDUCATION

# Colleges Lose Scientists

► AMERICAN COLLEGES and universities are losing many distinguished scientists to industry and government, Dr. A. J. Brumbaugh, vice president of the American Council on Education, told the Educational Conference luncheon of the annual Science Talent Institute.

Dr. Brumbaugh and Dr. M. H. Tryten, director of the Office of Scientific Personnel of the National Research Council, discussed peacetime scientific personnel problems.

Terming the equitable distribution of scientists "an especially critical problem," Dr. Brumbaugh said that many scientists who left education during the war to go into positions in government and industry have failed to return to the colleges and universities, "because salaries and other conditions are less favorable in

education than in government and industry."

He said that heavy teaching loads are handicapping research in colleges and universities.

The modern scientist, Dr. Brumbaugh declared, must be educated far beyond the laboratory. He must be educated in economics, government, the cause of tensions among peoples of the world, systems of philosophical thought and the ideals that dominate peoples and nations.

"Inasmuch as the day of splendid isolation of the scientist from the practical affairs of society has passed," the educator said, "the scientist must share with the economist, the political scientist, the anthropologist, the philosopher, the responsibility for appraising the social effects of his inventions and discoveries."

Science News Letter, March 15, 1947

**FUN WITH SCIENCE—Martin Karplus shows his ornithological records; Rada Demerec, genetic studies; Milton Gordon, synthesis of indole; Clarence Gregory, Jr., molecular weight determination; Irene Nagy, *Penicillium* cultures; Herman Bieber, electric power plant; Walter Kamb, pothole demonstration apparatus; Mary Addleman, extracts of chlorophyll and dyes; Donald Maynard, collection of insects; John Hayes, homemade spectrograph; Leon Cooper, penicillin-resistant bacteria; Jerome Eisenberg, minerals collection. Read left to right.**

## SCIENCE NEWS LETTER

Vol. 51 MARCH 15, 1947 No. 22

The weekly summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N St., N. W., Washington 6, D. C. NORTH 2255. Edited by WATSON DAVIS.

Subscriptions—\$5.00 a year; two years, \$8.00; 15 cents a copy. Back numbers more than six months old, if still available, 25 cents.

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Entered as second class matter at the post office at Washington, D. C., under the Act of March 3, 1879. Established in mimeographed from March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to Periodical Literature, Abridged Guide, and the Engineering Index.

The New York Museum of Science and Industry has elected SCIENCE NEWS LETTER as its official publication to be received by its members.

Member Audit Bureau of Circulation. Advertising Representatives: Howland and Howland, Inc., 393 7th Ave., N.Y.C., PENNSYLVANIA 6-5566, and 360 N. Michigan Ave., Chicago, STate 4439.

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## MEDICINE

## TB Vaccine Announced

Vaccine made of dead tuberculosis germs has been found to be successful against TB germs in guinea pigs. More studies must be made before it is tried on people.

► A NEW KIND of vaccine against tuberculosis is announced by Drs. B. J. Olson and Karl Habel and Bacteriologist Willard R. Piggott of the National Institute of Health of the U. S. Public Health Service.

The new vaccine is as effective against tuberculosis in guinea pigs as the famous BCG vaccine and seems destined to replace the latter and be much more widely used.

BCG, the only other effective vaccine against tuberculosis so far developed, is made of living tuberculosis germs. This has made many medical and health authorities fear to use it, though the germs have been grown in a way to make them lose their disease-producing power.

The new vaccine is made from dead tuberculosis germs. They came from a patient in Tennessee and were a virulent strain. They were killed by ultraviolet light, following a method developed in wartime secrecy by Drs. F. Oppenheimer and S. O. Levinson of Chicago. Because the germs in the vaccine are dead, doctors probably will not hesitate to use it.

Whether it will be effective in protect-

ing humans against tuberculosis is not yet known. More studies of the vaccine will be made before it is tried in humans. For one thing, the scientists want to find out whether it is effective against other strains of tuberculosis germs. So far it has only been tried against the strain of germs from which it was made.

Three weeks after the last dose of the vaccine, the guinea pigs in the experiments were given a huge dose of virulent tuberculosis germs. They all got tuberculosis, but 50% of them survived twice as long as 50% of nonvaccinated guinea pigs given the same huge dose of TB germs. This was as good as the results with a single dose of live BCG vaccine and better than results with a vaccine from heat-killed germs, ultraviolet-killed BCG and three doses of live BCG vaccine.

Why three doses of live BCG vaccine were less effective than a single dose of the same vaccine is another question for which the scientists are now seeking an answer. Details of the tests with the new vaccine are reported in *Public Health Reports* (Feb. 28).

*Science News Letter, March 15, 1947*

## MEDICINE

## Streptomycin Scores Again

► FOUR LITTLE children with tuberculosis of the lungs are apparently getting well after one month of treatment with streptomycin, medicine's newest TB-fighting weapon.

Instead of spending many months in bed in a hospital or sanatorium, waiting for healing to go on, these children have shown improvement after only one month of treatment. Their fever has gone down to normal. Their lungs have improved. They have gained weight. They have escaped the danger of a generalized form of tuberculosis or of having the disease attack the covering of the brain and causing meningitis.

The improvement in these four little patients, whose ages range from seven months to three years, is reported by Drs. Heyworth N. Sanford and Donald

E. O'Brien of the Presbyterian-Rush Division of the University of Illinois in the *Journal of the American Medical Association* (March 8).

The children have all continued to improve after the streptomycin was stopped. It is only seven months since the first child was treated, so the doctors probably cannot yet say whether they will be "cured." The streptomycin was given to the children every three hours for 30 days.

Children tend to recover from tuberculosis if they are removed from the home where they were exposed to the disease and placed in good living conditions. But such improvement as these four made could hardly be expected after only one month in a hospital or sanatorium.

## STS Winner Writes

"During the past three years my time has been spent in making intensive studies in ornithology. This branch of zoology attracted me for two reasons—firstly, the possibility that birds offer of observing wild life close at hand during all seasons of the year; secondly, the presence of many intriguing unsolved problems in this field, such as various aspects of migration, range extensions, and life cycles. The work which I have done up to now consists of a systematic study of the class Aves, general observations in field ornithology, and finally an investigation of the life history and migratory status of a certain group of birds.

"All the work in ornithology which I have done up to now has been an introduction to the various aspects of the field and a practical background for college training in genuine zoological research. In the not too-distant future I desire to do some work on what is to me the most intriguing problem in ornithology—the so-called 'orientation ability' of birds. Because of the advance made during the war in such fields as radar and infra-red radiation, many new means of attacking this mystery could be developed and many large-scale experiments could be conducted. With these new research weapons I hope that I may do some small part in finding the answer to this unsolved enigma."—From the essay of Martin Karplus.

The drug which has compressed many months of treatment into one for these small patients was extracted from a mold-like organism found in the soil. Barely three years ago Drs. S. A. Waksman, E. Bugie and A. Schatz of Rutgers University reported that they had succeeded in extracting this chemical and that in the test tube it showed anti-TB action.

Tests by Mayo Clinic scientists on guinea pigs and later on patients with tuberculosis showed it the most promising chemical doctors had ever had for treating the white plague. At first it was available only in small amounts and at a very high cost.

The cost of streptomycin treatment is still high and it is not equally successful in all types of cases. But results such as those reported are giving doctors more and more hope that they are finally on the road to conquest of tuberculosis.

*Science News Letter, March 15, 1947*

## STS Winner Writes

"As one of my scientific projects, I worked on some fundamental genetic principles using *Drosophila melanogaster* (fruit flies), partly because I wanted to acquire the technique of handling *Drosophila* for work I shall be doing next summer, and partly because these principles are so important that I want to understand them thoroughly. I got the 'Drosophila Guide' published by the Carnegie Institution of Washington, obtained some flies and was allowed to use space in the laboratory of the Department of Genetics of the Carnegie Institution.

"The books I have read and the lectures I have attended make me realize the scope of the new and growing science, genetics—the endless amount of research on every kind of organism that still should be done.

"During the past summer, I worked as assistant to Professor Th. Dobzhansky from Columbia University, who was doing field work on *Drosophila pseudoobscura* in California. I am looking forward to the time when my knowledge will be sufficiently broad to enable me to carry on original research which may in some way contribute to our knowledge of living things."—From the essay of Vera Radoslava Demerec.

### ENGINEERING

## Ocean Oil-Well Problems

► DRILLING for oil in the ocean bed 10 miles from the coast presents special problems, the American Society of Mechanical Engineers was told in Tulsa, Okla., by R. G. Watts of the Magnolia Petroleum Company. He described special design features used in a recent drilling.

This company has just drilled a 12,874-foot hole in the Gulf of Mexico 10 miles from the Louisiana coast, the first operation of this nature so far from land, he stated. No production was obtained, but what oil men call "drilling directionally" from a whipstock set at about 10,500 feet is now under way. It is lateral drilling, or sidewise drilling, from the original hole.

Off-shore drilling is nothing new. Many producing wells are found in the waters off California, Louisiana, Venezuela and other coasts. Drilling ten miles at sea requires new techniques, but similar methods will soon be used

### BOTANY

## Students Do Botany Winter Field Work at 10,000 Feet

► A HARDY half-dozen botany students at the University of Colorado, together with their young professor and his wife, Dr. and Mrs. John W. Marr, are finding out what happens to mountainside vegetation in midwinter by going out and studying it on the spot despite low temperatures and high winds. One weekend each month, they climb to the University's summer research camp at a 10,000-foot elevation in the Rockies, to make records of winter weather data and observe effects of extreme cold, drying winds, snow burial and other winter climatic factors on the trees, shrubs and Alpine herbs.

Each student works on a separate research project, but they all keep within the same square mile, so that all may make use of meteorological data from the same instruments.

In addition to their botanical work, the six students are also receiving good training in skiing, snowshoeing, fire-building and other arts of survival under Arctic-Alpine conditions. Dr. Marr is well qualified in this field, having done botanical work in Greenland and the Hudson Bay region.

Science News Letter, March 15, 1947



**WHY ONE-SIDED?**—Dr. John W. Marr, of the University of Colorado, is studying buds in an investigation of why some high altitude trees grow on one side only.

under the ocean from the southeastern coast of the United States. Underwater explorations are now being made near the Bahama islands some 150 miles from Florida by scientists in diving-bells mothered by surface vessels. They are using so-called gravity and other instruments to determine if probable oil-bearing strata exist below. The final test, however, must be made by drilling.

Science News Letter, March 15, 1947

### ENGINEERING

## "Three-Speed" Electric Refrigerator Invented

► A HOUSEHOLD refrigerator with a large deep-freeze compartment at the bottom, a higher-temperature compartment for the keeping of ordinary prepared foods at the top, and sandwiched between them a smaller compartment for freezing ice cubes, desserts, etc., is covered by patent 2,416,777, issued to E. F. Schweller of Dayton, Ohio, assignor to the General Motors Corporation. The refrigeration mechanism is in the base, and liquid refrigerant is circulated to the various compartments through series of pipes.

Science News Letter, March 15, 1947

## MEDICINE

**Mold Chemical Checks Undulant Fever Germs**

► A CHEMICAL from a tan and brown mold found in the soil of a cattle inclosure may become a successful remedy for undulant fever.

Discovery of this chemical is announced by Dr. Grace A. Beal, University of Chicago bacteriologist, in a report to *Proceedings of the Society for Experimental Biology and Medicine* (Jan.).

This disease which humans get from infected cattle and pigs has apparently been on the increase in the United States. Reported cases are 50% higher this year than they were last year. The disease is not often fatal but incapacitates its victims for long periods. Relapses are frequent.

So far, penicillin and similar remedies from molds and other microbes have not been very successful in treating this disease.

The chemical Dr. Beal has discovered comes from a mold, probably belonging to the aspergillus group, which was found in the soil of an inclosure in which cattle infected with undulant fever germs were kept. SD-17 is the only name this mold has so far. When grown in artificial media, the mold is tan on one side and brown on the reverse side.

A small amount of the SD-17 chemical, one part in 64,000 of diluting solution, checks the undulant fever germs in the test tube.

Further studies will be needed to determine whether it can stop the germs in animal and human bodies and whether it is safe to use as a medicine. It has not yet been obtained in pure form, and it may turn out to be the same as another mold chemical, citrinin.

*Science News Letter, March 15, 1947*

## DENTISTRY

**Life-Prolonging Diet Pays Havoc With Teeth**

► A DIET that lengthens the life span and wards off cancer and degenerative diseases nevertheless plays havoc with the teeth.

This finding, which points to a relation between diet and teeth, is announced by a dentist and a nutritionist, Dr. Clifton A. H. Smith of New York and Dr. C. M. McCay, of Cornell University, in the *Journal of the American Dental Association* (March 1).

Rats, not men, were the subject of the

studies. The rats from the time they were weaned were kept on a diet so low in calories that they averaged only half the weight of control animals the same age on an unrestricted diet. The rats on short rations, however, lived about 50% longer than the controls. This effect on length of life has led Dr. McCay to advise humans:

"Eat what you should; after that eat what you will but not too much of it."

Kidney diseases, heart disease, tumors and chronic pneumonia did not develop as soon in rats on the unrestricted diet, another scientist reported.

As the retarded rats on the calorie-restricted diet got older, however, their teeth became more and more decayed. In contrast to the findings on the degenerative diseases, such as kidney and heart disease, tooth decay in the rats seemed to be correlated with the period of becoming mature or the establishment of adult body weight.

The fact that the control rats on a non-restricted diet were relatively free of tooth decay points again, the scientists state, to a diet factor that may limit or control tooth decay.

*Science News Letter, March 15, 1947*

## ARCHAEOLOGY

**Hawaiian Royal Feather Cape Can Be Seen in U. S.**

► OO AND IIWI feathers, secured in a net of olona fiber. That was the last word in the *haute couture* of Hawaiian society before the coming of the white man introduced mere pants and Mother Hubbard gowns. Only royalty might wear capes made of these rare red, black and yellow feathers.

Four such royal feather capes have been on display at the U.S. National Museum in Washington. They are a new acquisition, bequeathed to the Smithsonian Institution by the late Princess Abigail W. Kawanakoa, of Honolulu. They are beyond all price, for the art of making them is now totally lost.

The collection also includes a number of great wooden poi bowls, carved out of solid timber with stone tools. The largest is 84 inches in circumference and over 15 inches high, with walls less than one-half inch thick. Two of the bowls were once the property of King David Kalakaua, seventh monarch of Hawaii, who died in San Francisco in 1891.

*Science News Letter, March 15, 1947*

**IN SCIENCE**

## ENGINEERING

**Electric Heating Unit Keeps Windows Ice-Free**

► TO KEEP windows clear of snow and ice, C. E. Stroud of Ford City, Pa., and Herman Marini of New Kensington, Pa., build up a series of transparent safety-glass panels, each with an electric heating unit built in along its edges. Their patent, No. 2,416,778, is assigned to the Pittsburgh Plate Glass Company.

*Science News Letter, March 15, 1947*

## NUTRITION

**Calorie Need Debunks Pill-Sized Rations Idea**

► THE ONCE POPULAR notion that a man could get all the nourishment he needed for a day out of a pill-sized ration of chemicals or something approaching that is debunked by latest studies of the Quartermaster Corps.

Unless a man eats enough food to supply at least 1,800 calories per day he cannot retain from his food enough of the proteins essential for nourishment of his body tissues. The necessary proteins could be condensed into a ration of very small size, but the body needs calories from fats and starch and sweet foods to utilize the proteins. Proteins are ordinarily eaten in meat, eggs, fish, milk and cheese and beans.

"Life raft" rations giving a minimum of food and water for survival over extended periods are the aim of the Quartermaster Corps studies, but they give useful knowledge for such civilian problems as weight-reducing diets and the feeding of starving or semi-starving populations.

Diets deficient in calories, the QM scientists find, cause a pronounced fall in the basal metabolic rate which includes the rate at which the body converts food into energy. This leads scientific support to observations made of underfed persons in Europe and elsewhere, who were able to perform less and less work as the deficiencies in their diet persisted.

The fall in the basal metabolic rate is considered by scientists to be an indication of the effort of the body to compensate for dietary deficiencies.

*Science News Letter, March 15, 1947*

## SCIENCE FIELDS

## PHYSICS

**Dummy Rocket to Test Guided Missiles on Ground**

► A DUMMY ROCKET, actually a "flight simulator," is being constructed in a Yale University laboratory to test on the ground the devices that keep a guided missile in the air on its course.

This dummy rocket will duplicate flight characteristics of a speeding rocket missile many miles above the earth. When it is completed, the guiding equipment to be used in any new type of rocket can be attached and tested in exactly the same maneuvers through which the rocket will be directed after launching.

The control devices, necessary to direct a speeding rocket on a desired course, are complicated affairs. Important in them are vanes which can be manipulated to direct the flow of the escaping jet gases that power the rocket. Changing the direction of this discharge alters the course of the missile.

The flight simulator is being constructed by Yale in cooperation with the General Electric Company's long-range research program at Schenectady. The device will couple an intricate calculating machine with a GE mechanical arrangement driven by electric apparatus known as "servomechanism." With these rapid deductions can be made relative to the complex motion of a missile traveling at supersonic speeds.

Science News Letter, March 15, 1947

## MEDICINE

**Scarlet Fever Patients Need Penicillin Treatment**

► ALL PATIENTS with scarlet fever should be given penicillin treatment, four Washington, D. C., physicians advise fellow doctors through a report to the *Journal of the American Medical Association* (March 8).

The physicians reporting are Drs. Harold L. Hirsh, Georgine Rotman-Kavka, Harry F. Dowling and Lewis K. Sweet.

Good results with the mold chemical in treating 136 scarlet fever patients ranging in age from one to 41 years is the basis of their recommendation.

Temperatures fall promptly when penicillin is given, the doctors found. Patients have fewer complications. There are fewer carriers of the disease. The penicillin was given to some by mouth and to others by injection into the muscles every three or six hours.

The fact that it is usually given by hypodermic injection and must be given every few hours constitutes an obstacle to its use, in the opinion of two doctors from the Chicago Health Department, Drs. Archibald L. Hoyne and Rowine Hayes Brown. They report success in treating 116 patients with penicillin.

Chief advantage of penicillin in this disease, they state, is the fact that fewer complications occur when it is used than when patients are given any other kind of treatment.

Science News Letter, March 15, 1947

## NUTRITION

**German 1550 Calorie Diet Is Semi-Starvation**

► THE 1,550 calories per day which Herbert Hoover reports is the basic ration for millions of Germans in the American and British zones is a semi-starvation diet as defined by the Food and Nutrition Board of the National Research Council.

Diets providing caloric intakes for men of between 1,400 and 1,700 per day, with intakes for others in the community at correspondingly restricted levels, represent a semi-starvation diet, this group of nutrition authorities has declared.

An emergency subsistence diet, the same group stated, should provide at least 1,900 calories per head per day. For a satisfactory maintenance diet, the board set a minimum of 2,200 calories.

There may be many Americans, however, who do not eat much more than 1,550 calories per day. This is not to say that they should not eat more. Many would probably feel better and stronger if they did. Others may eat 1,550 calories a day or less because they are on medically prescribed reducing diets. Such diets provide large quantities of protein foods, like meat, eggs and fish, in proportion to sweets, starches and fat. They also include plenty of vitamins and minerals.

Science News Letter, March 15, 1947

## AERONAUTICS

**Psychologists Seek Simple Plane Instrument Panels**

► PSYCHOLOGISTS are seeking to develop more simple instrument panels for airplanes which will give the pilot all the information he needs with fewer, less confusing dials to read.

The University of Illinois department of psychology and Institute of Aeronautics are cooperating with the U. S. Navy in the project which may revolutionize the instrument panel on planes and help pilots.

The job of the psychologists is to find the easiest and quickest way to tell the pilot the information he needs to know. Starting with a blank panel, the scientists will attempt to design a new system for keeping the pilot informed while he is flying his plane.

New instruments or combinations of present instruments may result, and present dials may be replaced with glowing lights, charts, or even sound signals.

Prof. Alexander C. Williams, Jr., who served as a lieutenant commander in the Navy during the war and is now research assistant professor of psychology at the University of Illinois, will head the psychological work on the new panel. He says modern plane panels have some dials which are difficult to read, some dials which give superfluous information, and some dials which do not tell the pilot enough.

Science News Letter, March 15, 1947

## CHEMISTRY

**German Chemists Made Synthetic Cosmetics**

► GERMAN WOMEN had their face creams, perfumes, hair tonics and shampoos during the war, thanks to German chemists.

When foreign raw materials became scarce, or no longer available, these scientists developed substitutes. Many of them were based on synthetic glycol waxes, and oily materials extracted from wool fat.

The methods are no longer secret. American investigators of Nazi war industries have collected the formulas. American manufacturers of cosmetics, and others interested, can get a complete report on German Cosmetics from the U. S. Department of Commerce (Report PB-47526, \$3 for microfilm).

Science News Letter, March 15, 1947

## AGRICULTURE

# Old Fiber Has New Uses

Mechanical difficulties have delayed the use of nature's versatile fiber. Millions of dollars and much time is being spent on ramie's development.

By MARTHA G. MORROW

► RAMIE, probably the oldest plant fiber used by man, is one of the most promising of the "new" textile fibers. Perhaps used in wrapping the mummies of ancient Egypt, ramie is today an experimental fiber upon which millions of dollars and man-hours are being spent.

It is not growth of this stingsless nettle that is holding back production, but lack of satisfactory mechanical methods for harvesting the plant, separating the fiber from the stems on a large scale and chemicals for cleaning them. Many of these difficulties have recently been ironed out, or show promise of being solved.

### Strong Fiber

Ramie, the thin ring of fibers found just beneath the paper-thin bark of the plant, is one of the strongest of natural fibers. It is stronger than cotton, silk and even sturdy hemp.

Ramie absorbs water more readily than cotton. It can withstand torsion better than flax or hemp, but less well than cotton or silk. The fiber is about equal to cotton in elasticity.

When thoroughly cleaned of its natural gums and pectins, ramie's beautiful luster resembles that of silk. It takes dyes well and holds color better than most fabrics.

Banknote paper, typewriter ribbons, bandages, upholstery fabrics and carpet backing are a few of the uses visualized for hard-wearing, shrinkage-resistant ramie. Tire cord and yarn for insulating electrical cables present challenging fields for future operation. Ramie is excellent for use in conveyor belts and industrial fabrics where wet strength is important. Sheets and pillowcases, toweling and draperies are also among the myriad purposes for which this fiber is suited.

Ramie can be spun, woven or knitted on standard textile machinery. It can be used alone or in combination with cotton, rayon or wool. In combination with rayon, for instance, ramie promises a material for shirts and summer dresses that will absorb perspiration easily and

dry again quickly.

Unlike various other fabrics, particularly synthetics, ramie is much stronger wet than dry. Its tensile strength is sometimes as much as 60% to 90% higher when wet. The advantage of such a fiber for maritime use is apparent; it makes good cordage, fishing nets and sails.

Today ramie is grown commercially in China, Japan, Brazil and the Philippines. The crudely prepared raw fiber of China is known in international trade as "China grass." Adapted to a semi-tropical climate with an abundant rainfall on fertile soils, ramie is now being grown experimentally in the United States. About 3,000 acres of ramie are growing at present, but reports indicate more will be turned over to the plant this year. Ramie fiber is just beginning to appear on the market, the delay being partly due to delays in mill construction.

When mature, the plant is a straight stalk six to seven feet high, with few or no branches. From the upper quarter of

the stalk grow large heart-shaped leaves. The stems are small, only one-half to three-quarters of an inch in diameter at the butt end.

Scratch off the bark and there will be found a thin layer of individual fibers lying directly beneath. Within the ring of fibers is the natural wood part of the stalk. After fraying a few of the fibers loose from one end of a dried stalk, a ribbon of fibers several feet long can be pulled from the stem.

### Stem Maturing

When the green stems are allowed to mature, they usually turn brown and begin to seed at the top. If the stalk is allowed to continue to grow past its top fibrous stage, the fibers become coarse and brittle. Knowing when to harvest the stems is important if the fiber is to be obtained at its best, with greatest length and maximum tensile strength.

Ramie is known botanically as *Boehmeria nivea*. It belongs to the nettle family, but does not have the stinging hairs common among nettles. The plant was introduced into the United States about 90 years ago.

Experimental plantings have grown



**BEFORE SPINNING**—Steps in preparing the fiber for spinning are illustrated by dried ramie stems, ramie ribbon, degummed fiber and fiber cut into two-inch lengths.

best in the muck soils of the Florida Everglades and fertile alluvial stream beds along the Gulf of Mexico. Ramie has also produced well upon fertile, heavily-irrigated soils in the Southwest.

Although ramie can be grown from seed, it is usually propagated from pieces of root. Weeds must be controlled the first year, but after the second year the perennial usually becomes so well established that it crowds out other growths.

Ramie roots send up a new growth each spring. If the stems are cut during the growing season, which extends from April to November in Florida, a new crop immediately begins to grow and may attain a height of five to six feet in about 65 days. Under favorable conditions three or four crops may be obtained each season for ten years or longer.

To collect stems enough for immediate hand cleaning in primitive industries like those in China, ramie has traditionally been harvested by hand. In its natural growth, some of the plants mature before others, and even parts of the same outshoot of one cluster will be of different height and maturity.

Machine harvesting in some cases in the past have resulted in inferior, non-uniform fiber. More recently, however, careful cultivation and fertilization, use of superior ditching, draining and water

control, and overall good management has produced a more even, steady growth of plants. This has made mechanical harvesting practical.

Experimental work has been undertaken by the U. S. Department of Agriculture in co-operation with state agricultural experiment stations to develop improved techniques.

### Ramie Progress

A number of companies are interested in the cultivation of ramie and are actively trying to improve the plant and its preparation. These include the Newport Industries in co-operation with the U. S. Sugar Corporation, with the largest commercial output, and the Sea Island Mills, Inc. Others interested in Florida developments are Florida Ramie Products, Inc., and Ramie Mills of Florida, Inc.

Ramie fiber may be separated from the rest of the stalk, a process known as decortication, either while the stems are still green or after they have dried out. In the Orient ramie fiber is scraped from the green stems by hand with crude implements, a workman separating only a few pounds of fiber each day. Need of an efficient mechanical cleaner, so that the American industry can compete with cheap Oriental labor, has been one of the important factors holding back greater production of ramie in this country.

### Machines Used

Machines designed to mechanically scrape away the bark and woody core from the fiber are of two general types. Large, permanent decorticating machines separate the fiber from stems grown on thousands of near-by acres, the stems being hauled some distance to the decorticator. But such installations require large financial investments. Transportation cost limits the area of usefulness although large output may offset haulage costs. Huge production machines also often injure the fiber badly.

Smaller, portable machines can be set up in the field where needed. This is an advantage, for not only need the stalks be carried but a short distance to the decorticator or the decorticator brought to the stems, but the green waste can easily be put back in the field, necessitating but slight chemical fertilization to support the next crop of heavy vegetable growth. Portable machines used heretofore, however, handled relatively few stems and called for many man-hours of work.

Since ramie was introduced to this



**STRIPPING STALK**—A ribbon of ramie fiber is stripped from a green stalk on an experimental field of the U. S. Sugar Corporation.

country in 1855, a number of machines have been designed. Many are based on hemp and sisal machines with slight adjustments, others are developed specifically for ramie. Today many new types of decorticator are being designed and difficulties overcome.

Several firms are particularly interested in the end use of ramie, including Collins and Aikman; Sea Island Mills, Inc.; Johns-Manville; and Silver Thread Co.

A large proportion of the ramie fiber is reduced to its ultimate cells, whereas flax, hemp and jute are rarely broken down so far. The ultimate cells of ramie are longer than those of any other plant-yielding fiber utilized in textiles or cordage. They average six to eight inches in

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length, and range from 0.002 to 0.003 inch in diameter.

The natural gums, waxes and pectins of the fiber are removed chemically. The ramie fiber coming from the decorticator is about one-fifth to one-third gum. The gum content of the fiber is next reduced to about four per cent so the fibers will be permanently separated from each other and in good condition for yarn spinning, or the fibers may be degummed at the spinning mill. Chemical processes for degumming ramie are as

numerous and complex as the methods and machines for decortication.

The quantity of ramie obtained from an acre varies greatly in the United States. During a good season permitting four cuttings, 30 to 40 tons of green stems and tops have been harvested. But fresh stems may yield only two to four per cent crude fiber, called ramie ribbons.

From 100 pounds of green stalks and leaves containing a high percentage of moisture, 52 pounds of stalks stripped of leaves may be salvaged. When air-dried, the stalks will weigh about 10.5 pounds. Only two to four pounds of decorticated fiber will be gotten from such a harvest, however, resulting in but 1.2 to three pounds of degummed fiber as spun.

Many ramie specialists feel their work is still too much in the experimental stage, and prices and competitive markets too unsettled to make definite predictions about the future of the fiber. But the number of acres planted in ramie is steadily increasing, indicating the faith of those working with this versatile fiber.

A THINGS of science unit containing specimens of ramie and the story of its development to a fabric may be obtained from Science Service, 1719 N St., Washington 6, D. C., for 50 cents.

Science News Letter, March 15, 1947

## Atoms, Planets & Stars

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Dr. Albert Einstein Wrote as follows:

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- 10—Curvature of the earth with comparative heights and depths.
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The acute form of plutonium is like the acute sickness that comes when the entire body is irradiated with X-rays or radium. In addition there is gross liver damage and shrinkage of the spleen. When injected into the veins, the chemical is at first concentrated in the liver and spleen and later is transferred within the body to the bones.

Within a year after plutonium is injected under the skin, tumors may appear at the site of the injection. Loss of hair, ulcers, and loss of limbs are other effects.

Reinvestigating radium, Dr. Brues and his associates found that it not only causes bone cancers but also produces heavy calcification of the middle coats of the larger arteries.

Yttrium, radioactive cerium and strontium were among the other dangerous atomic fission products investigated.

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Science unravels speech

## Writing with your voice

Years ago Alexander Graham Bell dreamed of "a machine that should render visible to the eyes of the deaf, the vibrations of the air that affect our ears as sound." He never realized that dream, but his researches led to the invention of the telephone.

Today Bell Telephone Laboratories have turned the dream into a fact — translating the spoken word into readable pictures.

By this new invention of the Laboratories, the talker speaks into a microphone. Vibrations of the voice are unraveled through electronic circuits, and then are reassembled as luminous patterns which travel across a screen. Each syllable of sound has a distinctive shape and intensity.

Visible speech is still in its infancy, and is not yet available to the public. But educators

of the deaf are now evaluating it. Indications are that the deaf can learn to read the patterns and, by comparing the patterns their own voices make with the patterns of correct speech, can improve their diction.

Patterns of visible speech also provide a means for analyzing and recording sound in the study of phonetics and of languages. Eventually, visible speech may make possible visual telephony for the deaf.

This is but one of many contributions by Bell Telephone Laboratories to the understanding and control of sound.



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Spring Without Flowers

► PUSSY-WILLOWS are sure arousers of spring enthusiasm, alder catkins will be hailed as signs of the winter's ending, even skunk cabbages receive a friendly nod. Yet they are not the only harbingers of spring; plenty of plants that have no flowers to offer us make their early-season bows about now, and are worthy of at least a passing glance when we go for our first spring walks in the woods and fields.

Ferns we are apt to notice. Some hardy species have been with us all winter long, though the cold purpled their leaves. From among this dark foliage, as well as out of the dead and withered last-year leaves of other ferns, rise the fascinating "fiddle-heads" that will uncurl soon into the light green

fronds of the new season's growth.

Ferns you are likely to find everywhere, though most of them prefer woodsy or brushy places. Open spaces, where they can get the benefit of full sunlight, are the choice of the ferns' second cousins, the horsetails or scouring-rushes.

For all their kinship to the ferns, horsetails are most un-fern-like in their appearance. Their cylindrical stems rise straight and uncompromising, with whorls of stiff, wiry branches that make them look like small skeleton trees. In one common species, spores are borne in cones on the tips of unbranched stems, while the so-called "sterile" stalks are the only ones that have branches.

Though they may look like little trees, they are trees without leaves. The whorls of branches contain all the plants' chlorophyll and are called on to

do the work of leaves. Nor were the horsetail trees always miniatures. Ages ago, when coal was a-making, representatives of their division of the plant kingdom grew rankly to full tree height, and formed dense thickets in the still, damp forests of unrecognizably strange growths. These giants all became extinct, leaving only their meek little relatives to inherit the edges and corners of the earth that are not wanted by better-adapted competing seed-plants.

The second common name of the horsetail, scouring-rush, has survived the use that once gave it meaning. The very noticeable harshness of the plant's stems is due to their high content of silica. A handful of this harsh herbage is a really effective abrasive or scouring material.

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Robert A. Cooke—Saunders, 572 p., illus., \$8. This survey of the fields of allergies covers fundamentals, diagnosis, and treatment and includes complete etiology, pathology, symptoms, differential diagnosis, and immunology for the more common ones.

THE CULTIVATION OF VIRUSES AND RICKETTSIAE IN THE CHICK EMBRYO—W. I. B. Beveridge and F. M. Burnet—British Information Service, Medical Research Council Special Report Series No. 256, 92 p., illus., paper, 70 cents. Containing much information concerning techniques in this field, this report is also an encouragement to introduce virus-work into the classroom.

THE ECHO—Lilia Van Saher—Dutton, 252 p., \$2.75. This interesting, fast-moving novel by a keen student of psychoanalysis is being widely acclaimed for its scientific accuracy.

HANDBOOK OF THE TREES OF THE NORTHERN STATES AND CANADA—Romeyn B. Hough—Macmillan, 470 p., illus., \$5.50. A reprint of a standard volume on tree identification; illustrations of the tree together with leaves, fruits or berries, bark, and transverse section of wood.

HISTORY OF MEDICAL THOUGHT—Richard A. Leonardo—Froben, 92 p., illus., \$2. A thoughtful essay on this neglected phase of medicine, showing the influence of philosophy on medicine throughout the ages.

A HISTORY OF SCIENTIFIC ENGLISH—Edmund Andrews—Richard R. Smith, 342 p., \$7.50. Although the expressed purpose of this book is to trace the development of scientific idioms, it is also an interesting introduction to the subject of comparative philology.

HOW TO SAIL; A Complete Handbook of the Art of Sailing for the Novice and the Old Hand—Carl D. Lane—Norton, 267 p., illus., \$3. The numerous diagrams in this beginner's book answer all questions and teach the basic principles of handling sailing craft.

INTERNATIONAL COUNCIL OF SCIENTIFIC UNIONS, Vol. IV, Report of Proceedings July 22-24, 1946—F. J. M. Stratton, ed.—Cambridge University Press, 127 p., \$1. This series of reports in both French and English deals with the coordination of the activities of various International Scientific Unions and their responsibilities to UNESCO.

MAMMALS OF CALIFORNIA—Lloyd Glenn Ingles—Stanford Univ. Press, 258 p., illus., \$4. Accounts of all species of mammals found in California, with keys for easy identification, range maps, and accounts of natural history.

MAN IN NORTHEASTERN NORTH AMERICA—Frederick Johnson, ed.—Published by the foundation, Vol. III, 348 p., illus., paper, \$2. These papers of the Robert S. Peabody Foundation for Archeology discuss environment, culture in various aspects, mythology, linguistics, psychological characteristics and physical types of man in this region.

MECHANISMS OF REACTIONS AT CARBON-CARBON DOUBLE BOND—Charles C. Price—Interscience, 120 p., \$2.50. This book, the result of a cycle of lectures at the Polytechnic Institute of Brooklyn, represents the first of a series of Lectures on Progress in Chemistry; it reviews and correlates what is known and what is generally believed about the subject matter.

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PROCEEDINGS OF THE AMERICAN PHILOSOPHICAL SOCIETY—Luther P. Eisenhart, ed.—*Publ. by the Society*, Vol. 91, No. 1, 136 p., paper, \$1.50. Symposia cover America's role in the growth of science, present trends and international implications of science, and problems of international cooperation.

THE RADIO AMATEUR'S HANDBOOK: The Standard Manual of Radio Communication, 1947 ed.—*American Radio Relay League*, 152 p., illus., paper, \$1.25. The text has been revised and rewritten in the light of present-day needs as a radio construction manual and training text for class or home study.

ROOT DEVELOPMENT AND ECOLOGICAL RELATIONS OF GUAYULE—Cornelius H. Muller—*Govt. Printing Office*, U. S. Dept. Agric. Tech Bul. No. 923, 114 p., illus., paper, 25 cents. The great interest in guayule as a source for rubber during the critical shortage instigated this report of a special research project.

SUCCESS ON THE SMALL FARM—Haydn S. Pearson—*McGraw-Hill*, 285 p., illus., \$2.50. Here is offered a specific program for making a substantial cash profit from a one-man farm of ten or twelve acres so that the farmer may provide his family with the necessities, comforts and minor luxuries of life.

THERE IS NO MYSTERY ABOUT PATENTS—William R. Ballard—*Barrett*, 120 p., \$2. In a condensed form, the fundamentals of the American patent system are presented to show how and why this system works to accomplish its intended purpose.

WAR AND HUMAN NATURE—Sylvanus M. Duvall—*Public Affairs Committee*, Pamphlet No. 125, 32 p., illus., paper, ten cents. This discussion of an old problem concludes that the solution to a lasting peace is world-wide education.

WAR STRESS AND NEUROTIC ILLNESS—Abram Kardiner and Herbert Spiegel—*Hoeber*, 428 p., \$4.50. This second edition, completely rewritten, of "The Traumatic Neuroses of War" not only provides a systematic presentation of the nature and treatment of the disorder, but is also a contribution to our understanding of the mind in health as well as in sickness.

Science News Letter, March 15, 1947

#### BACTERIOLOGY

### New Antibiotic Isolated From Penicillin Mold

THREE BRITISH microbiologists, C. E. Coulthard, W. F. Short and Robert Michaelis, have isolated a new antibiotic from the same mold that yields penicillin. Their product, covered by patent 2,416,821, has been named notatin.

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